

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN SEMI-AUTOMATIC PACKAGING MACHINES

(71) I, JOHN CECIL THOMAS KNIGHT, of 50 Brewery road, London, N.7., a British Subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to semi-automatic packaging machines of the kind which comprise a loading station at which shallow trays are successively loaded with articles to be packaged, conveyer means which, in use, carry loaded trays from the loading station to a wrapping station at which each loaded tray is wrapped manually with sheet plastics material to form a package, and an oven through which wrapped trays are carried on the conveyer means to effect sealing of the package.

Machines of the kind set forth are known which include conveyer means in the form of a continuously moving conveyor for carrying loaded trays from the loading station to the wrapping station and in which the wrapping station comprises a wrapping table to which each loaded tray is manually transferred from the conveyor immediately prior to wrapping thereof to form a package. The conveyor means includes a further continuously moving conveyor onto which each wrapped tray is manually transferred from the wrapping table and which carries the tray through the oven to effect sealing of the package.

According to the present invention there is provided a semi-automatic packaging machine of the kind set forth, in which the conveyor means includes a conveyor which, in use, carries trays from the loading station to the wrapping station, and in which there are provided sensing means responsive to movement of a tray into and out of the region of the wrapping station for stopping the conveyor when each tray is at the wrapping station to permit manual wrapping of the tray and for restarting the conveyor when the tray is manually removed from the wrapping station.

Preferably, the sensing means includes a photo-electric device responsive to movement

of a tray into and out of the region of the wrapping station.

Two embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which like parts have been given the same reference numerals, and in which:

Figure 1 is a somewhat diagrammatic plan view of a packaging machine according to the invention,

Figure 2 is a somewhat diagrammatic plan view of part of a second embodiment of the invention,

Figure 3 is a side elevation of the packaging machine of Figure 2.

With reference to Figure 1, a vegetable packaging machine comprises two endless belt conveyors 2 each driven by an electric motor controlled by suitable electric circuits, and extending from a loading station 4, through a wrapping station 6 and thence through an oven 8.

At the loading station 4, in operation, weighed amounts of vegetables to be packaged are loaded into shallow trays which are then placed onto one of the conveyors 2. Each tray comprises an oblong base portion to which are joined upwardly and outwardly extending side portions. Each loaded tray 10 is carried on the conveyor to a wrapping station 6, at which the conveyor belt passes closely over a horizontally disposed flat rectangular table 12, which, in use, supports the conveyor belt when a loaded tray is being wrapped as described below.

At diagonally opposed corners of the table 12 are fixed a photo-electric cell device 14 and co-operating lamp 16, which are connected to the control circuits of the electric motor driving the conveyor, the arrangement being such that as, in operation, a loaded tray 10 is moved on the conveyor 2 to a position at the middle of the table 12, the photo-electric cell device 14 is operated by movement of the tray into a position between the lamp 16 and device 14, to cause the motor and conveyor 2 to be stopped.

At one side of the table 12 is a reel 18

[Price 5s. 0d. (25p)]

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of sheet plastics disposed with its axis parallel to the direction of movement of loaded trays on the conveyor and resting on two spaced metal rollers (not shown). The sheet plastics consists of a thin gauge polyvinyl chloride sheet which tends to adhere to itself. The sheet plastics material passes from the bottom of the reel 18 beneath the table 12 where its free end can be gripped by an operator standing at the side of the table remote from the reel so that sheet material can be drawn from the reel by the operator. In operation, the operator moves the free end of the sheet away from himself over a loaded tray 20 on the table 12, and rucks the end of the sheet beneath the base of the tray at the side remote from the operator. He then lifts the tray from the table 12 and moves it towards himself to cause the plastics sheet to wrap around the side of the tray nearer the operator and engage the base of the tray to adhere to the end of the plastics sheet engaging the base. The tray is moved downwardly by the operator to sever the plastics sheet wrapping the tray from the reel by means of a taut, heated wire 22 fixedly located at the side of the table 12 nearest the operator. To complete the wrapping the edges of the plastics sheet wrapping the tray are then folded beneath the tray by the operator, who then moves the wrapped tray momentarily on to a hot plate 23 to cause the sheet folded beneath the tray to adhere to itself. The wrapped tray is then placed by the operator on the conveyor 2 at a position at the side of the table 12 remote from the loading station 4.

Movement of the wrapped tray from the table operates the photo-electric cell device 14 to re-start the conveyor 2 to move a further loaded tray onto the table 12. Thus, during the final stages of wrapping and replacing a wrapped tray onto the conveyor 2, a further tray is being moved by the conveyor onto the table 12, so that the further tray is in position for wrapping as soon as the operator has finished with the wrapped tray.

At the side of each table 12 remote from the loading station 4 each wrapped tray is delivered to a further conveyor 24 on which it is carried through an oven 8 (usually known as a shrink tunnel) maintained at a suitable temperature, to effect sealing of the package and slight contraction of the plastics sheet so that the packaged articles are held firmly in the tray.

The trays emerging from the oven 8 are delivered onto a horizontally disposed circular table 26 which is rotated in the direction of the arrow shown in the drawing, and on which the trays accumulate so that they can be transferred from the packaging machine when desired.

It will be appreciated that by dispensing with the steps of transferring trays from a conveyor to a wrapping table an appreciable sav-

ing of time in each packaging operation can be achieved.

Instead of utilising the same conveyor for carrying loaded trays from the loading station to the wrapping station and carrying wrapped trays from the wrapping station to the conveyor carrying the trays through the oven, a further conveyor could be provided on which each tray would be placed after wrapping thereof and which would carry the tray to the oven. In that case the further conveyor could be arranged between the two wrapping tables and associated conveyors. Alternatively, one conveyor could be used to carry trays from a single loading station to a single wrapping station and from there to the oven. In that case, by suitably arranging the positions of the oven and table, each wrapped tray could be disposed within the oven during a wrapping period when the conveyor is stationary, so that the length of the oven could be reduced to a minimum.

Instead of the photo-electric cell device and co-operating lamp, other means could be provided for stopping the conveyor when a tray is positioned over the wrapping table, for example a pressure sensitive device responsive to the pressure of the conveyor on the table, or an ultra-sonic device.

In the embodiment shown in Figures 2 and 3, table 12 at the wrapping station is arranged near the end of the conveyor 2, the photoelectric means 14, 16 being arranged to stop the conveyor 2 when a loaded tray 20 is positioned on the table close to the end of the conveyor. The hotplate 23 is disposed at the end of conveyor 2. The reel 18 of plastics sheet is located beneath the end of the conveyor, the plastics sheet passing upwards between the end of the conveyor 2 and hotplate 23, and over a transversely disposed supporting roller 30. A heated wire 22 for severing the sheet is disposed in front of roller 30.

In operation, the operator stands at the side of hotplate 23 furthest from the conveyor. As each loaded tray is moved into position at the end of the conveyor, the tray is wrapped as described in connection with the first embodiment. The wrapped tray is then placed on a further conveyor (not shown) on which it is carried through a shrink tunnel.

It will be apparent that the packaging machine of this embodiment is more compact than that of the first embodiment, and can be used in a confined space.

#### WHAT I CLAIM IS:—

1. A semi-automatic packaging machine of the kind set forth, in which the conveyor means includes a conveyor which, in use, carries trays from the loading station to the wrapping station, and in which there are provided sensing means responsive to movement of a tray into and out of the region of the wrapping station for stopping the conveyor when each tray is at the wrapping station to permit man-

ual wrapping of the tray and for restarting the conveyor when the tray is manually removed from the wrapping station.

5 2. A packaging machine as claimed in claim 1, in which the conveyor is arranged to pass closely over a table at the wrapping station and the sensing means is arranged to stop the conveyor when each tray is positioned over the table.

10 3. A packaging machine as claimed in claim 1 or claim 2, in which the sensing means includes a photo-electric device responsive to movement of a tray into and out of the region of the wrapping station.

15 4. A packaging machine as claimed in claim 3, in which the conveyor is arranged to pass closely over a table at the wrapping station and the photo-electric means comprises a photosensitive device and a co-operating lamp disposed at diagonally opposite corners of the table.

20 5. A packaging machine as claimed in any one of claims 1 to 4, in which the conveyor is an endless belt conveyor.

25 6. A packaging machine as claimed in any preceding claim, in which the conveyor means includes a further conveyor arranged to receive wrapped trays from the first-mentioned conveyor, and to carry the wrapped trays through the oven thereby to effect sealing of the packages.

30 7. A packaging machine as claimed in any one of claims 1 to 5 in which the conveyor is arranged to carry wrapped trays through the oven thereby to effect sealing of the packages.

35 8. A packaging machine as claimed in any one of claims 1 to 6, in which the conveyor means includes two spaced, parallel conveyors arranged to carry trays from the loading station to the wrapping station, there being provided sensing means associated with each conveyor, and the conveyor means includes a take-off conveyor arranged to receive wrapped trays

from both the first-mentioned conveyors and to carry the trays through the oven to effect 45 sealing of the packages.

9. A packaging machine as claimed in any preceding claim, in which the sheet plastics material for wrapping the trays is carried by a reel or reels disposed at one side of the or 50 each conveyor, the sheet passing, in operation, beneath the conveyor at the wrapping station to an operators' position at the side of the conveyor remote from the reel.

10. A packaging machine as claimed in claim 8, in which a horizontally disposed hotplate is arranged between the conveyor at the wrapping station and the operator's position. 55

11. A packaging machine as claimed in any one of claims 2 to 6, in which the table is located near the end of the conveyor at the wrapping station, and the sheet plastics material for wrapping the trays is carried on a reel disposed beneath the end of the conveyor, the sheet passing, in operation, to an operator's position spaced from the end of the conveyor in the direction of movement of the conveyor. 60

12. A packaging machine as claimed in claim 11, in which a hotplate is disposed horizontally in a position spaced from the end of the conveyor and between the end of the conveyor and the operator's position, and the plastics sheet from the reel passes, in operation, upwardly between the end of the conveyor and the hotplate. 65

13. A packaging machine constructed, arranged and adapted to operate substantially as described, with reference to, and as shown in, Figure 1 or Figures 2 and 3 of the accompanying drawings. 70

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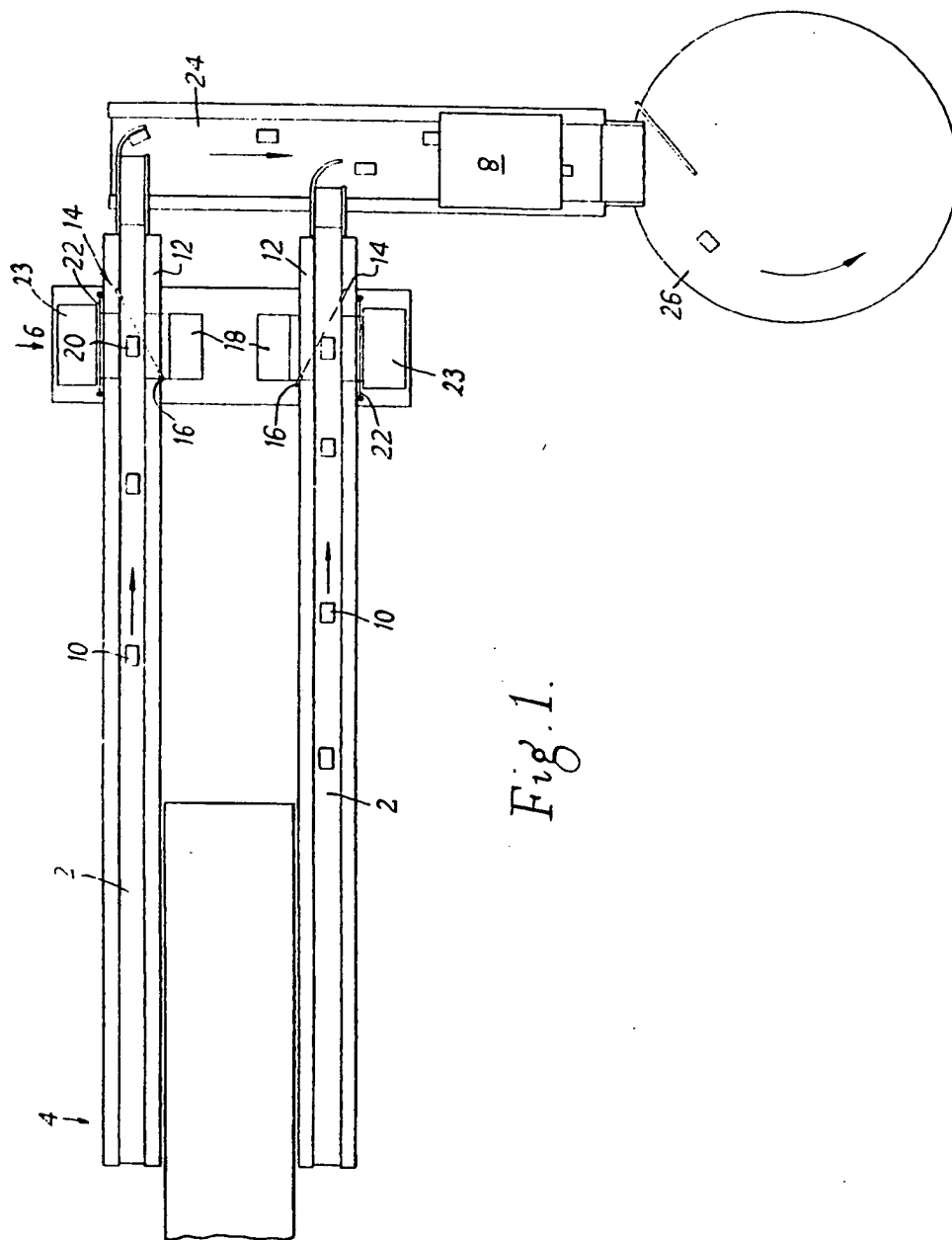


Fig. 1.

